

CONTENTS

PAPERS AND DISCUSSIONS

(Alphabetical Indexes Begin on Page 1371)

No.		Page
2656	ICE PRESSURE AGAINST DAMS: A SYMPOSIUM.....	1
	STUDIES OF THE EFFECTS OF TEMPERATURE VARIATIONS	
	By Bertil Löfquist.....	6
	Discussion:	
	By G. E. MONFORE.....	17
	EDWIN ROSE.....	18
	BERTIL LÖFQUIST.....	20
	SOME INVESTIGATIONS IN CANADA	
	By A. D. Hogg.....	22
	EXPERIMENTAL INVESTIGATIONS BY THE BUREAU OF RECLAMATION	
	By G. E. Monfore.....	26
	Discussion:	
	By EDWIN ROSE.....	39
	G. E. MONFORE.....	41
2657	STIFFNESS CHARTS FOR GUSSETED MEMBERS UNDER AXIAL LOAD	
	By John E. Goldberg.....	43
	Discussion:	
	By LEONARD K. STEVENS.....	58
	JOHN E. GOLDBERG.....	59
2658	ELECTRONIC DEVICES IN AIR TRANSPORT	
	By F. B. Lee.....	60
	Discussion:	
	By P. C. SANDRETTO.....	70
	F. B. LEE.....	72
2659	DAM MODIFICATIONS CHECKED BY HYDRAULIC MODELS	
	By E. S. Harrison and Carl E. Kindsvater.....	73
	Discussion:	
	By G. H. HICKOX.....	90
	E. S. HARRISON AND CARL E. KINDSVATER.....	92
2660	RAPID COMPUTATION OF FLEXURAL CONSTANTS	
	By Thomas G. Morrison.....	93
	Discussion:	
	By HENRY MALTER.....	103
	PAUL ROGERS.....	106
	THOMAS G. MORRISON.....	107

IV

No.		PAGE
2661	SPECIAL DESIGN FEATURES OF THE YORKTOWN BRIDGE By Maurice N. Quade	109
2662	UNIFIED MASS-TRANSPORTATION SYSTEM FOR NEW YORK By William Reid	124
	Discussion: By JOHN F. KRAUS	132
2663	SLACKWATER IMPROVEMENT OF THE COLUMBIA RIVER By O. E. Walsh	135
2664	AERONAUTICAL CHARTING AND MAPPING By Charles A. Schanck	151
	Discussion: By E. S. FABLAN	158
	PHIL M. MILES	161
	CHARLES A. SCHANCK	162
2665	CITY PLANNING TECHNIQUES By Russell H. Riley	163
2666	EARTHQUAKE STRESSES IN SHEAR BUILDINGS By M. G. Salvadori	171
	Discussion: By JOHN A. BLUME	194
	E. F. MASUR	201
	EDWARD COHEN, EDWARD LAING, AND LEON S. LEVY	203
	M. G. SALVADORI	205
2667	VELOCITY MEASUREMENT OF AIR-WATER MIXTURES By Lorenz G. Straub, John M. Killen, and Owen P. Lamb	207
2668	RADIAL IMPACT ON AN ELASTICALLY SUPPORTED RING By Edward Wenk, Jr.	221
	Discussion: By JOHN C. BURGESS	246
	EDWARD WENK, JR.	247
2669	RAINFALL STUDIES USING RAIN-GAGE NETWORKS AND RADAR By H. E. Hudson, Jr., G. E. Stout, and F. A. Huff	248
	Discussion: By VEN TE CHOW	274
	H. E. HUDSON, JR., G. E. STOUT, AND F. A. HUFF	275
2670	ZONING MAPS FOR AIRPORTS By Benjamin Everett Beavin, Sr.	277
	Discussion: By HAROLD M. LEWIS	286
	BENJAMIN EVERETT BEAVIN, SR.	290
2671	THE EQUIVALENT RECTANGLE IN PRESTRESSED CONCRETE DESIGN By John J. Peebles	292
	Discussion: By FRED E. KOEBEL	303
	JOHN J. PEEBLES	306

No.		PAGE
2672	NONELASTIC BEHAVIOR OF BRIDGES UNDER IMPULSIVE LOADS	
	By S. J. Fraenkel and L. E. Grinter	309
	Discussion:	
	By ROBERT J. HANSEN AND JOHN S. ARCHER	329
	S. J. FRAENKEL AND L. E. GRINTER	330
2673	FRICITION FACTORS FOR TURBULENT FLOW IN PIPES	
	By Edward F. Wilsey	331
	Discussion:	
	By GEORGE A. WHETSTONE	337
2674	GROUP LOADINGS APPLIED TO THE ANALYSIS OF FRAMES	
	By I. F. Morrison	338
	Discussion:	
	By BERNARD L. WEINER	353
	I. F. MORRISON	354
2675	DESIGN OF SIDE WALLS IN CHUTES AND SPILLWAYS	
	By D. B. Gumensky	355
	Discussion:	
	By LELAND S. RHODES	362
	G. S. SARKARIA	363
	J. H. DOUMA	364
	EDGAR E. FOSTER	368
	THOMAS J. RHONE	368
	D. B. GUMENSKY	371
2676	THE DESIGN OF FLEXIBLE BULKHEADS	
	By James R. Ayers and R. C. Stokes	373
	Discussion:	
	By W. F. HEAVEY	384
	MORGAN S. CAMPBELL	385
	WALTER C. BOYER	386
	P. W. ROWE	388
	GREGORY P. TSCHBOTARIOFF	390
	J. OWEN LAKE	392
	NAI C. YANG	394
	DAVID HOPKINS	396
2677	RATING CURVES FOR FLOW OVER DRUM GATES	
	By Joseph N. Bradley	403
	Discussion:	
	By GUIDO WYSS	421
	SAM SHULITS	421
	BOB BUEHLER	421
	F. B. CAMPBELL AND A. A. MCCOOL	428
	JOSEPH N. BRADLEY	431
2678	SEWAGE DISPOSAL IN TIDAL ESTUARIES	
	By Alexander N. Diachishin, Seth G. Hess, and William T. Ingram	434
	Discussion:	
	By ISADORE NUSBAUM	448
	ALEXANDER N. DIACHISHIN, SETH G. HESS, AND WILLIAM T. INGRAM	451

VI

No.		PAGE
2679	A DIRECT STEP METHOD FOR COMPUTING WATER-SURFACE PROFILES	
	By Arthur A. Ezra	453
	Discussion:	
	By I. H. STEINBERG	463
	C. A. M. GRAY	469
	BOB BUEHLER	470
	MONIE M. KANSOH	475
	ARTHUR A. EZRA	477
2680	OFFSHORE PETROLEUM INSTALLATIONS	
	By Jack S. Toler	480
2681	RECENT AIRPORT DESIGN AND DEVELOPMENT	
	By Philip A. Hahn	489
	Discussion:	
	By LOUIS A. NEES	497
	PHILIP A. HAHN	498
2682	DEFLECTION OF MEMBERS OF VARIABLE MOMENT OF INERTIA	
	By Anthony Hoadley	499
2683	THE GRANBY PUMPING PLANT: A SYMPOSIUM	509
	FOUNDATIONS AND DESIGN	
	By W. R. Judd and W. H. Wolf	510
	CONSTRUCTION	
	By R. J. Willson	525
2684	SPECIAL PROCEDURES FOR PAVEMENT DESIGN	
	By L. A. Palmer	542
	Discussion:	
	By R. HORONJEFF	561
	L. A. PALMER	563
2685	NUMERICAL ANALYSIS OF CONTINUOUS FRAMES IN SPACE	
	By James Michalos	565
2686	REVENUE BOND FINANCING FOR AIRPORT IMPROVEMENTS	
	By James C. Buckley	583
2687	SNOW HYDROLOGY FOR MULTIPLE-PURPOSE RESERVOIRS	
	By Herbert S. Riesbol	595
	Discussion:	
	By RAY K. LINSLEY	614
	R. W. GERDEL	615
	HAROLD D. HAFTERSON	619
	DAVID M. ROCKWOOD	621
	HERBERT S. RIESBOL	624
2688	WAVE-WASH CONTROL ON MISSISSIPPI RIVER LEVEES	
	By Rudolf Hertzberg	628
2689	DESIGN CURVES FOR ANCHORED STEEL SHEET PILING	
	By Walter C. Boyer and Henry M. Lummis, III	639
	Discussion:	
	By GREGORY P. TSCHBOTARIOFF	651
	WALTER C. BOYER AND HENRY M. LUMMIS, III	655

VII

No.		Page
2690	ALGAE RESPONSIBLE FOR ODOR AND TASTE IN WATER SUPPLIES By George J. Turre	658
2691	ANALYSIS OF CORRECTIVE ACTIONS FOR HIGHWAY LANDSLIDES By R. F. Baker	665
	Discussion: By D. P. KRYNINE AND RICHARD J. WOODWARD	690
	R. F. BAKER	696
2692	POST-BUCKLING STRENGTH OF REDUNDANT TRUSSES By E. F. Masur	699
2693	THE ENGINEER'S ROLE IN METROPOLITAN TRAFFIC PLANNING By Lloyd Braff	713
	Discussion: By JAMES L. FOLEY, JR.	719
2694	DEFLECTION OF LAMINATED BEAMS By L. G. Clark	721
2695	BRIDGES ON THE WEST VIRGINIA TURNPIKE By Elmer K. Timby	737
2696	HIPPED PLATE ANALYSIS, CONSIDERING JOINT DISPLACEMENTS By Ibrahim Gaafar	743
	Discussion: By HERMAN CRAEMER	771
	JAMES M. PAULSON AND L. C. MAUGH	772
	R. GARTNER	776
	IBRAHIM GAAFAR	779
2697	PUTTING A SEWAGE TREATMENT PLANT INTO OPERATION By Benjamin Benas	785
2698	STRESSES IN THE CORNERS OF RIGID FRAMES By Harvey C. Olander	797
2699	CONTINUOUS COMPOSITE STEEL AND CONCRETE BEAMS By John Sherman	810
2700	LATERAL BUCKLING OF CHANNELS AND Z-BEAMS By H. N. Hill	829
2701	RELIEF WELL SYSTEMS FOR DAMS AND LEVEES By W. J. Turnbull and C. I. Mansur	842
	Discussion: By P. T. BENNETT	862
	JOHN A. FOCHT, JR.	870
	W. H. JERVIS	874
	W. J. TURNBULL AND C. I. MANSUR	875
2702	WIND LOADS ON TRUSS BRIDGES By John M. Biggs	879
	Discussion: By F. B. FARQUHARSON	893
	JOHN M. BIGGS	896

VIII

No.		PAGE
2703	MASS-CONCRETE OPERATIONS IN THE ROCKY MOUNTAINS By George P. McIndoe.....	899
2704	AMPLIFICATION OF STRESS IN FLEXIBLE STEEL ARCHES By Robert S. Rowe.....	910
	Discussion: By MILO S. KETCHUM.....	926
	ROBERT S. ROWE.....	926
2705	FREQUENCY OF EXCESSIVE RAINFALLS IN FLORIDA By David B. Smith.....	927
2706	PLATES WITH BOUNDARY CONDITIONS OF ELASTIC SUPPORT By S. J. Fuchs.....	935
	Discussion: By M. Z. v. KRZYWOBLOCKI.....	959
	R. H. WOOD.....	960
	S. J. FUCHS.....	966
2707	AN INTERSTATE ROUTE AND ITS URBAN CONNECTIONS By D. W. Ormsbee.....	969
2708	LIVE LOADING FOR LONG-SPAN HIGHWAY BRIDGES By R. J. Ivy, T. Y. Lin, Stewart Mitchell, N. C. Raab, V. J. Richey, and C. F. Scheffey.....	981
	Discussion: By LOUIS BALOG.....	995
	GLENN B. WOODRUFF.....	999
	WILLIAM G. BYERS.....	1001
	KUANG-HAN CHU.....	1002
	R. J. IVY, T. Y. LIN, STEWART MITCHELL, N. C. RAAB, V. J. RICHEY, AND C. F. SCHEFFEY.....	1003
2709	PEAK DISCHARGE FOR HIGHWAY DRAINAGE DESIGN By Carl F. Izzard.....	1005
	Discussion: By MAX A. KOHLER.....	1016
	ROY F. WARNER.....	1017
	N. E. MINSHALL.....	1018
	CARL F. IZZARD.....	1022
2710	DESIGN CHARTS FOR AIR CHAMBERS ON PUMP LINES By W. E. Evans and C. C. Crawford.....	1025
	Discussion: By C. E. WITHERS.....	1037
	HENRY M. PAYNTER.....	1039
	W. E. EVANS AND C. C. CRAWFORD.....	1045
2711	ELECTRICAL ANALOGS OF STATICALLY LOADED STRUCTURES By Frederick L. Ryder.....	1046
2712	RIVER-BED SCOUR DURING FLOODS By E. W. Lane and W. M. Borland.....	1069
	Discussion: By E. E. DIETBRENNER.....	1080
	EMMETT M. LAURSEN AND ARTHUR TOCH.....	1084
	E. W. LANE AND W. M. BORLAND.....	1087

IX

No.		PAGE
2713	HIGHWAY BRIDGES ON DEEP FOUNDATIONS	
	By Louis Duclos	1090
	Discussion:	
	By ARTHUR V. WALKER	1100
2714	MECHANICS OF MANIFOLD FLOW	
	By John S. McNown	1103
	Discussion:	
	By JULIO ESCOBAR	1119
	M. R. CARSTENS AND JOHN ROBERSON	1123
	JAMES J. HARTIGAN	1128
	SADIQ M. NIAZ	1132
	JAMES R. BARTON	1134
	RALPH W. POWELL	1136
	JOHN K. VENNARD AND DARRHL I. DENTONL	1136
	JOHN S. MCNOWN	1140
2715	DESIGN OF FRAMES BY RELAXATION OF YIELD-HINGES	
	By J. Morley English	1143
	Discussion:	
	By NOEL W. MURRAY	1154
	HERMAN TACHAU	1155
	J. MORLEY ENGLISH	1156
2716	LAMINAR TO TURBULENT FLOW IN A WIDE OPEN CHANNEL	
	By W. M. Owen	1157
	Discussion:	
	By YUICHI IWAGAKI	1165
	J. W. DELLEUR	1167
	RALPH W. POWELL AND CHESLEY J. POSEY	1170
	HENRY MAKSOU D	1172
	W. M. OWEN	1174
2717	ANALYSIS OF WATER HAMMER BY CHARACTERISTICS	
	By C. A. M. Gray	1176
	Discussion:	
	By PIN-NAM LIN	1190
	HENRY M. PAYNTER	1191
	C. A. M. GRAY	1193
2718	JOINT TRANSLATION BY CANTILEVER MOMENT DISTRIBUTION	
	By L. E. Grinter and C. H. Tsao	1195
	Discussion:	
	By T. C. KAVANAGH	1204
	RALPH W. STEWART	1205
	W. MERCHANT	1206
	JACK R. BENJAMIN	1206
	JOSEPH G. PERRI	1207
	RICHARD H. HADLEY	1207
	MING-LUNG PEI	1208
	L. E. GRINTER AND C. H. TSAO	1209
2719	TURBULENT BOUNDARY LAYER ON STEEP SLOPES	
	By William J. Bauer	1212
	Discussion:	
	By G. HALBRONN	1234
	WILLIAM J. BAUER	1240

No.		Page
2720	ANCHORED BULKHEADS	
	By Karl Terzaghi.....	1243
	Discussion:	
	By T. H. Wu.....	1281
	W. D. BIGLER.....	1284
	J. BRINCH HANSEN.....	1285
	GREGORY P. TSCHBOTARIOFF.....	1287
	PAUL BAUMANN.....	1296
	RUDOLF BRISKE.....	1298
	NORMAN D. LEA.....	1299
	S. PACKSHAW.....	1301
	J. VERDEYEN AND V. ROISEN.....	1307
	KARL TERZAGHI.....	1311
2721	THE ENGINEER AND WORLD POPULATION: ADDRESS AT THE SUMMER CONVENTION, ATLANTIC CITY, N. J., JUNE 16, 1954	
	By Daniel V. Terrell, President.....	1325
	MEMOIRS OF DECEASED MEMBERS: ABSTRACTS.....	1331